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MINERAL REPLACEMENTS IN PEGMATITES*

WALDEMAR T. SCHALLER, *U. S. Geological Survey, Washington, D. C.*

In discussing the subject of the origin of pegmatites you remember the controversy that raged sometime ago as to whether they were dikes or veins, the essential difference being that dikes are igneous in origin whereas veins were formed by the aid of circulating waters. A compromise was offered suggesting that the material from which they were formed was in an aqueo-igneous condition. But all these ideas postulated a single period of formation. I would like to offer for your consideration another explanation for the formation of pegmatites.

The general processes of nature producing igneous plutonic rocks may perhaps be classified into two general groups; the magma process and the hydrothermal process. Each of these processes possesses at least three distinctive features. The magma process is characterized by the fact that the finished product, the solid rock, is nearly one hundred per cent the same composition as the magma; that it is essentially a closed system; and that it owes its liquidity primarily to heat. The hydrothermal process, on the other hand, yields a solid end product which is only a very small part of the total quantity of material present and reacting during the hydrothermal stage; it is an open system, much material moving, coming in, and going out; and it owes its liquidity essentially to the presence of a solvent and not to heat. Now the effect of later hydrothermal material entering and reacting on the solid rock formed during the magma process is a reaction which I call replacement. So by the mineral replacements in pegmatites I mean that you first have a solid rock formed by the magma process which was then, later, more or less acted upon and replaced by minerals formed as the result of the hydrothermal process.

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* Presidential address presented at the seventh annual meeting of *The Mineralogical Society of America,* in Joint Session with *The Geological Society of America,* Madison, Wis., December 27, 1926.

Bowen has shown how solid minerals may react with the remaining liquid magma, on cooling, to form a new set of minerals, when the equilibrium and stability relations are changed. How much more readily such reaction series changes and replacements can take place in the hydrothermal stage! It should be emphasized at this point that although the two processes have their distinctive features and yield a different set of mineral combinations, they are both the effects of one single general magmatic process, are very closely related, and it may be difficult accurately to delegate certain stages of the general process to one or the other of the two processes mentioned.

So this is the theory I have to offer[1] for your consideration, namely, that a good many of the pegmatites as now seen are the result of two processes; the original formation by the cooling of the magma and the later reaction and more or less complete replacement by hydrothermal agencies. If this is true, then it seems, judging from field evidence, that the first magma process yielded a solid rock consisting essentially only of potassium feldspar with perhaps a very small quantity of sodium feldspar and only a very small quantity of quartz, *but no other minerals.* The later hydrothermal replacement process yielded a long series of minerals or mixtures of minerals. If but a single mineral is the end product of such replacement action, it may be quartz, magnetite, pyrrhotite, calcite, or others.

The view that pegmatites had such a history was developed[2] some two years ago in conjunction with Dr. Larsen as a result of study of pegmatites in San Diego County, California. Here it could readily be seen both in the field and later in laboratory studies, that all the minerals now present in the pegmatites, with the exception of the potassium feldspar and some quartz, were later introductions, for the rock here replaced is a beautifully developed graphic-granite with its very characteristic structure, the quartz as seen on the cleavage planes of the feldspar being elongated, and in sections normal to the feldspar cleavages, showing the well known six-sided or cuneiform shape. This structure could still be observed in many phases of the replaced pegmatite and the gradual change from a microcline quartz graphic-granite to the finer-grained rock, now composed of sodium feldspar, mica, garnets, and other minerals, could readily be traced. The sodium feldspar first replaces the potassium feldspar, and then the quartz; later the micas and the garnets replace the sodium feldspar, new quartz comes in, and the lithium minerals, the phosphates, the beryls, etc., follow.

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[1] This address represents a brief summary of the important points of a paper on the same subject to be published later, fully illustrated, probably by the U. S. Geological Survey.

[2] Preliminary paper published: Schaller, W. T., The genesis of lithium pegmatites: *Amer. J. Sc.*, Vol. **10**, pp. 269–279, September, 1925.

Although in this field the graphic-granite is referred to as the rock replaced by the later hydrothermal solutions, I am not at all sure that the graphic-granite itself was the original rock for there is a decided sequence of formation of the different minerals of the graphic-granite. This is particularly true of the quartz rods for they clearly cut across the perthite lamellae. They have a definite oriented relation to the cleavage directions of the potassium feldspar and the cross-sections of the quartz rods, normal to their elongation, while six-sided, do not have angles of exactly sixty degrees but have angles several degrees different, apparently the resultant compromise of the crystal forces of both the feldspar and the quartz. In other words, the quartz of graphic-granite, has its position defined by the properties of the potassium feldspar and is clearly later than it. At present I am inclined to believe that the original rock formed by the magma process was a relatively fine-grained high-temperature potassium feldspar (possibly orthoclase) rock, which on cooling reverted to microcline, the low-temperature modification, which by its many planes of weakness, such as cleavage and twinning, afforded a maximum opportunity for the entrance of the replacing hydrothermal solutions. If such solutions contained almost no additional mineral matter but consisted essentially only of water, in some form, this may have had some sort of an annealing or recrystallization effect on the fine-grained inverted orthoclase, yielding the very large crystal units of microcline now found.

I have no belief in the validity of the idea of ascribing the structure of graphic-granite to eutectics, in fact I am rather inclined to believe that in general, for rocks, a eutectic-like structure can almost be considered as evidence not of simultaneous crystallization but of replacement effects.

So that for pegmatites the general sequence of mineral formation seems to be somewhat as follows: High-temperature potassium feldspar, inversion to microcline, a little perthite, quartz, albite, muscovite, and the general group of such minerals as black tourmaline, garnets, common beryl, followed by the lithium minerals, the phosphates, sulphides, carbonates, and oxides. Quartz seems to come in pretty generally all along the line of replacement. Any one of these minerals may have more than one generation and reversals of order of formation also occur. The euhedral crystals of microcline commonly found in pegmatites are of a later generation than the massive compact microcline.

If this sequence of replacement is correct, then the rare minerals should not be found in any pegmatite which has not been subjected to the replacement process. Or, in other words, there should be associated with such rare minerals those of replacement origin, such as albite, quartz, muscovite, etc. Now the examination of a good many specimens of pegmatite containing rare minerals, has shown that albite is always present and has replaced more or less completely the original potassium feldspar. This fact has not been generally recognized; for example, in a recent published description of a rare mineral, the host mineral was described three times in the text as microcline and the legend under the illustration described it as microcline, whereas a microscopic study of the feldspar showed that it had all been changed to the sodium feldspar albite and that there was no microcline remaining. In the magnetite pegmatites of northern Minnesota, described by Grout, the albite present increases correspondingly with the magnetite.

In a recent paper on the feldspars by Alling, he is surprised that petrographers have often failed to recognize in perthites two distinct generations of the sodium feldspar and I would add that I am surprised that petrographers have failed to recognize that the second type which constitutes the great bulk of perthites is a secondary replacement for it is not difficult to find in many pegmatites examples where the microcline contains a varying quantity of the perthite lamellae which reach a percentage of almost one hundred. In other words, the microcline has been practically completely perthitized.

In order to convincingly prove that such replacement processes have been at work, one must carefully consider what are the criteria of replacement. Rounded masses of minerals, optically uniformly oriented, can not be universally considered as residua of replacement, but each set of mineral associations must be considered by themselves. For example, in myrmekite, an intergrowth of plagioclase feldspar and quartz, derived as a secondary reaction from potassium feldspar, the quartz is in elongated or rounded detached masses, optically uniformly oriented, yet no one would suggest for a moment that these quartz masses are replacement residua. On the other hand, such rounded masses of microcline may well be indicative of residua. But one of the best and most satisfactory evidences of replacement are cross-cutting veins, especially with smaller apophyses, and if accompanied by isolated impregnations diminishing in quantity when further away from the main cross-cutting vein and especially if the cross-cutting vein follows a cleavage or fracture line of the host. Examples of such replacements where the sodium feldspar has entered the microcline and where quartz, mica, and garnets have followed the cleavage planes of the microcline, can be found in most pegmatites, and show that the history of pegmatites is not the result of a single event but on the other hand is the result of a long continued process of the reaction series type.

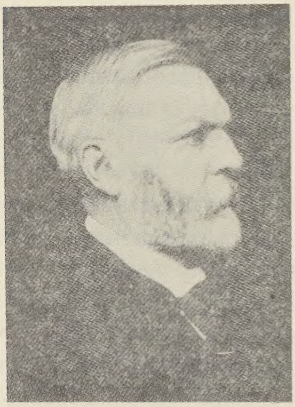
If the theory of the formation of pegmatites, as outlined above holds, namely, that if they consist of minerals other than potassium feldspar they are largely replacement effects, then one is justified at least in asking whether or not a similar condition holds for many igneous rocks. If it does, and if the accessory minerals and other hydrous minerals such as the hornblendes and the micas for example, in a granite, are not original pyrogenic minerals formed directly from the magma but are later reaction products in an already formed rock, then not only must our ideas of the genesis of igneous rocks in general be modified but a new scheme of genetic classification of rocks will be needed.

MEMORIAL OF WASHINGTON A. ROEBLING*

ALEXANDER H. PHILLIPS, *Princeton University.*

All mineralogists learned with sorrow and regret of the death of Colonel Washington A. Roebling at his residence in Trenton, New Jersey, on the afternoon of July 21, 1926, in his ninetieth year.

Colonel Roebling was born at Saxonburg, Pennsylvania, on May 26, 1837. His father, John A. Roebling, a civil engineer and graduate of the Royal Polytechnic School of Berlin, emigrated to the United States in 1831. He settled near Pittsburgh, Pennsylvania, and established the Roebling family in America.



WASHINGTON A. ROEBLING, 1837—1926

Colonel Washington A. Roebling graduated from the Rensselaer Polytechnic Institute at Troy, New York, as a civil engineer in the class of 1857; and he has long been considered by that institution one of its most eminent alumni. After graduation, he joined his father in the construction of the various noted suspension bridges of this country, as the Niagara Falls bridge, the Allegheny bridge at Pittsburgh, the Ohio River bridge at Cincinnati, all of which led up to the building of the East River bridge at New York.

Colonel Roebling served his country during the entire length of the Civil War, enlisting as a private the day after the attack on Fort Sumter, and being present as a colonel at the surrender of Lee at Appomattox on April 9, 1865.

His talent as an engineer and bridge builder was soon recognized, and early in his military career he was assigned to various engineering duties. He constructed the suspension bridges across the Rappahannock and across the Shenandoah River at Harpers Ferry.

At the close of the war he again joined his father, who had conceived and was working on the plans for the Brooklyn Bridge.

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* Memorial read at the seventh annual meeting of The Mineralogical Society of America, Madison, Wisconsin, December 28, 1926.

Unfortunately, his father was not destined to see it completed, as he met his death through an accident in locating the Brooklyn tower of the bridge. Here the Colonel took up the work of his father, and labored faithfully for fourteen years in building a monument both to his father and himself, which stands as a testimonial to plans well conceived, accurately designed, and faithfully executed in their construction. It is seldom that the success of the son adds luster to the career of an already renowned father, but this is true of Washington A. Roebling.

Early in the construction of the foundations of the bridge, through his conscientious care, he exposed himself many hours at a time to high air pressure of the caissons. He contracted caisson fever or "bends"; and so serious was the attack that he was not only forced to give up active supervision of the work, but his life was thought to be in grave danger. It was during this period of enforced inactivity more than fifty years ago that this versatile man laid the foundation of his remarkable collection of minerals. To alleviate his suffering from the then little understood ailment, he was kept in a dark room; and for amusement and diversion he studied, by the light of a candle, his then small collection. Throughout the remainder of his life, though he had many interests other than that of his business, there is no doubt that his greatest pleasure was derived from his minerals, and his happiest hours were those which he could spare from a busy life in showing them to his friends.

Colonel Roebling collected minerals, as he did everything else, with that meticulous attention to detail which led him to study each individual specimen and to verify the correctness of its identification and locality. He knew his collection so thoroughly (and there were more than 16,000 specimens) that he could describe instantly the specimens representing any species in his collection. He read the literature, noted carefully the descriptions of new species, and corresponded at once for specimens of the type locality; and when a species was represented by but few specimens, he followed the wanderings of each, and always persisted in the chase until the desired object was obtained. His joy was so keen on such occasions that he often said that he would never leave his collection to a museum, as he must have many specimens that others desired and he disliked depriving others of the pleasure that he always experienced after such a successful chase of a particularly fine specimen.

He would always ask a visitor what mineral he was interested in, or what mineral he wished to see, with that quiet touch of pride which is a pardonable companion of a conscious knowledge of completeness. However rare the mineral, the Colonel could go directly to the proper drawer and produce a specimen. He has often remarked that he had a specimen of every known mineral and variety; then he would always add "with few exceptions." The Roebling collection was never catalogued, nor was a specimen ever numbered to connect it with its label. For this reason he seemed to be very particular in the handling of his specimens, as he had the constant fear of getting the labels misplaced. Very often the history of a specimen would be found neatly folded in the tray, with the opinion of noted mineralogists in regard to it, together with notes by the Colonel, often written in a humorous strain, in that fine and perfect script. The Colonel's quiet humor was always the delight of his friends, and this is reflected all through the collection. Here and there a tray will be empty, with a note "This specimen has been loaned now for two years. Time it was returned." These remarks were not always complimentary, but he would record a joke on himself with equal fairness. He loved each specimen, as his collection in his later years was his enjoyment, his pleasure, his complete interest, his life. Near the end, when his sight was failing, he remarked: "My life is over, as I can no longer see my minerals." He was always willing to sacrifice specimens for research or analysis; and many were the calls for rare minerals or type specimens, and it was indeed seldom that he failed to deliver the material.

He was a charter member of the Mineralogical Society of America, and served as its Vice-President in 1924. In February last, conscious of his failing health and realizing the financial handicap under which the MINERALOGIST was being published, he generously donated $45,000 towards an endowment fund, accompanied by the following brief and characteristically modest note:

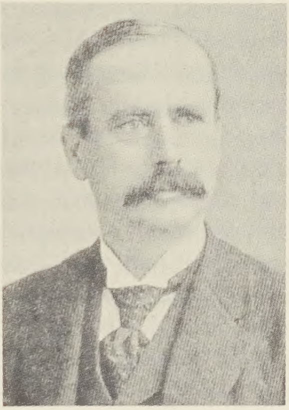
> This gift is unconditional. I wish, however, that the whole, or part of it, be devoted to the publication of the monthly magazine, THE AMERICAN MINERALOGIST, which has been conducted on too narrow a margin.

The science of mineralogy has lost a patron and all mineralogists a friend; and those whose privilege it has been to visit him in his own home, to experience his gracious hospitality, to look upon that kindly face, and could who appreciate that humorous twinkle in his eyes, know how great that loss really is.

MEMORIAL OF FREDERICK ALEXANDER CANFIELD*

Charles Palache, *Harvard University.*

The death of Mr. Canfield leaves an irreparable gap in the ranks of American mineralogists. Although not a large contributor to the literature of the science, he was one of the most active and discriminating collectors of his period. To quote his own words, the collector "takes a scientific or an aesthetic pleasure in accumulating new, strange and interesting objects, which may be studied with profit or arranged to please the eye." In both respects he satisfied his definition. He was himself a keen student of the characters of minerals and his interest in their correct and scientific determination led him to take counsel with many of the active workers in the science and thereby repeatedly brought to light new and important mineralogical facts. Those whose privilege it was to see him in his home and with his minerals cannot easily forget the keenness of his delight in his treasures. And his accurate observations made in many lands, together with his remarkable memory for events and specimens, made his conversation replete with interest to the mineral lover.



Frederick A. Canfield,
1849—1926

Mr. Canfield lived all his life in an environment favorable to the growth of a love of minerals. He was born on April 7, 1849, in the Canfield Homestead at Ferromonte near Dover, New Jersey, where he lived all his life. He died at Morristown, New Jersey, on July 3, 1926. At Ferromonte his father, Frederick Canfield, had gathered together a choice collection of the minerals of the Franklin zinc mines and the son preserved these always in the cases in which they were originally arranged in 1856. Both father and son were mining men and their home was in the midst of iron mines, important in their day but now only picturesque ruins. Canfield was graduated from Rutgers College in 1870 and in 1873 received the degree of Mining Engineer from the Columbia School of Mines. In 1914, Rutgers conferred upon him the honorary degree of Doctor of Science. His continuing interest in his college was shown by numerous gifts during his lifetime and by several bequests including his collections other than minerals, his home and the sum of fifty thousand dollars to be used for the museum of natural history.

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* Memorial read at the seventh annual meeting of the *Mineralogical Society of America,* Madison, Wisconsin, December 27, 1926.

Canfield was a member of the American Institute of Mining Engineers from 1874 until his death but took no active part in its affairs. His mining practice was largely in the New Jersey iron region and later in the mines of Virginia and North Carolina. During two years, from 1885 to 1887, he was engaged in engineering work in South America at the silver mines of Bolivia. There he made important collections for mineralogical science. He brought back abundant specimens of the rare germanium mineral argyrodite and discovered the related tin mineral named canfieldite in his honor by Professor Penfield. He also discovered fossil plants which established the geological age (tertiary) of the rocks containing the famous silver mines of Cerro de Potosi. In 1890 he again went to South America and visited the iron mines of Brazil.

Mr. Canfield began his own collection of minerals shortly after his father's death in 1865 and continued to add to it up to the last year of his life. He early specialized in the minerals of New Jersey, particularly those of that most prolific of American localities, Franklin, and the zeolites of Bergen Hill and Paterson. In 1889 he prepared for the Final Report of the State Geologist of New Jersey a catalogue of minerals found in the state, giving exhaustive details of localities for each which proved his careful study of this subject. His interest in the mines and geology of the state led to his appointment as a member of the Board of Managers of the Geological Survey of New Jersey, a position which he held from 1898 to 1915 when the survey was reorganized.

His mineral collection, besides containing rich and unique series of local minerals, became a general one and ultimately grew to number eight or nine thousand specimens. These were chosen with the greatest care and were catalogued and labeled with scrupulous accuracy. Canfield's later years were wholly devoted to its care and improvement. He spent days over his binocular microscope developing partly hidden crystals on his favorite specimens. To insure completeness in his collection, he prepared a most ingenious check-list comprising the names and characters of all known minerals, kept up to date as new species were described. This check-list might well be published; none so complete and so compact is in existence.

As a collector he was interested in the fate of other mineral collections and kept notes on them for many years which he printed privately in 1923. In this pamphlet he records the names of some 170 collectors, briefly describes their collections, and tells of the ultimate disposition of each. The record is unique and of much historical interest.

Canfield bequeathed his mineral collection to the Smithsonian Institution together with an endowment of fifty thousand dollars to insure its care and continued growth. It must be a great satisfaction to all mineralogists and particularly to all of his friends that his splendid collection is thus to remain intact, a permanent memorial to its maker. Few private collections in any land have exceeded it in completeness or in the fine quality of its individual specimens. As regards the minerals of his native state it was quite incomparable.

Mr. Canfield was a charter fellow of the Mineralogical Society of America and its vice-president during the year 1922–23. He was also long a member of the New Jersey Historical Society and was deeply versed in geneology and in the early history of his state. His collections of coins of New Jersey and other objects of historical interest were bequeathed to this society. His Geneology of the Canfield Family is said to be a model of what such a work should be. He never married and for many years lived almost alone, his minerals the main object of his care.

The writer of this memoir cannot bring it to a close without recording his personal indebtedness to Mr. Canfield, accumulated through the thirty years of our acquaintance. From his personal knowledge of the Franklin mines and his abundant collections of their minerals, I have drawn a large share of the facts relating to the early history of this mine and its products for a study of that deposit which had its inception with my first visit to his house. Such data as well as material for investigation and a splendid series of photographs of his choicest Franklin crystals were placed freely at my disposal. His modest and retiring disposition was a dominant trait of his character which hid from all but intimate friends the rich stores of his mind.

MINERALOGICAL PAPERS OF F. A. CANFIELD

1. Catalogue of Minerals Found in New Jersey. *N. J. G. S.*, Final Rp. 2, 1–42b (**1889**).

2. Mineralogical Notes (Willemite, N. J., Argyrodite and Canfieldite, Bolivia). *Am. J. Sc.*, (4) **23**, 20–22 (1907).

3. Mosesite, a New Mercury Mineral from Terlingua, Texas. (With Hillebrand, W. F., and Schaller, W. T.) *Am. J. Sc.* (4) **30**, 202–208 (1910); *Zeit. Kryst.*, **49**, 1–8 (1911).

4. Thomsonite in New Jersey. *Sch. Mines Q.*, **32**, 215–216 (1911).

5. Mosesite. *Sch. Mines Q.*, **34**, No. 3 (1913).

6. Twinning in the New Jersey "pseudomorphs." *Am. Mineral.*, **2**, 48 (1917).

7. Crystals of Water. *Am. Mineral.*, **2**, 90 (1917).

8. The Final Disposition of Some American Collections of Minerals. Dover, N. J. **1923.**

MEMORIAL OF JOSEPH PARKER WINTRINGHAM*

THOMAS I. MILLER, *Newark, N. J.*

It is with regret that we record the death of Joseph P. Wintringham at Oakland, New Jersey, on July 17, 1926. He was born at 153 Henry Street, Brooklyn, New York on May 2, 1852. He attended the Juvenile High School and Polytechnic Institute in Brooklyn, also boarding schools at Bloomfield, New Jersey and New Milford, Connecticut. When sixteen years of age he was ready to enter the School of Mines, Columbia University, but was denied admittance until he should reach the age of eighteen years. He first entered the cutlery business in New York in December, 1869, but subsequently became a broker in stocks, bonds and insurance. He retired from active business in 1909.

JOSEPH P. WINTRINGHAM,
1852—1926

Mr. Wintringham was a charter

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* Memorial read at the seventh annual meeting of the *Mineralogical Society of America*, Madison, Wisconsin, December 27, 1926.

member of the Mineralogical Society of America and was elected Fellow in December, 1925. He was also a member of the New York Mineralogical Club, New York Academy of Sciences, New York Microscopical Society, Brooklyn Institute of Arts and Sciences, Electrical Engineers, and the American Mathematical Society. Being of a mathematical turn of mind he became interested in the optical properties of minerals and the use of the microscope in solving optical problems. He had a clear and logical mind, and his opinions were always timely and constructive. He possessed a kindly and sympathetic disposition, and those who knew him feel a deep personal sorrow in his death.

PROCEEDINGS OF THE SEVENTH ANNUAL MEETING OF THE MINERALOGICAL SOCIETY OF AMERICA

Frank R. Van Horn, *Secretary.*

The Mineralogical Society of America held its seventh annual meeting on December 27, 28 and 29, 1926, in conjunction with the Geological Society of America at Madison, Wisconsin, as guests of the University of Wisconsin and the Wisconsin Geological and Natural History Survey. On Monday, December 27, at 2:00 P.M. President W. T. Schaller called the regular annual meeting to order in Room 206, Agricultural Hall. On motion of the Secretary, the reading of the minutes of the last annual meeting was dispensed with, in view of the fact that they have been printed on pages 59–68 of Volume 11 (Number 3) of THE AMERICAN MINERALOGIST.

ELECTION OF FELLOWS AND OFFICERS FOR 1927

The Secretary announced that 154 ballots had unanimously been cast for the officers as nominated by the Council. For fellow there was a unanimous vote of 71 votes in the affirmative. All officers and the fellow were declared elected.

The officers elected for 1927 are the following:

President: Austin F. Rogers, Leland Stanford University, California.
Vice-President: George L. English, Rochester, New York.
Secretary: Frank R. Van Horn, Case School of Applied Science, Cleveland, Ohio.
Treasurer: Alexander H. Phillips, Princeton University, Princeton, New Jersey.
Editor: Walter F. Hunt, University of Michigan, Ann Arbor, Michigan.
Councilor 1926–1930: Alexander N. Winchell, University of Wisconsin, Madison, Wisconsin.

The fellow elected follows:

K. K. Landes, Kansas State Geological Survey, Lawrence, Kansas.

The Secretary also announced that the Council by virtue of authority given it by the constitution had elected the following Honorary Life Fellows:

Professor G. Friedel, University of Strassburg, Strassburg, Alsace, France.
Professor Victor Goldschmidt, University of Heidelberg, Heidelberg, Germany.
Professor Paul von Groth, University of Munich, Munich, Germany.
Professor A. Lacroix, Museum of Natural History, Paris, France.
Professor L. J. Spencer, Natural History Museum, South Kensington, London, S.W. 7, England.

REPORT OF THE SECRETARY FOR 1926

To the Council of the Mineralogical Society of America:

The Secretary herewith begs to report that the roll of the Society now comprises 103 fellows and 205 members, a loss of 5 fellows and a gain of 18 members for the year notwithstanding the fact that 14 members have been dropped from the mailing list for non-payment of dues. Four fellows, Dr. Frederick A. Canfield, Colonel Washington A. Roebling, Dr. W. L. Uglow, and J. P. Wintringham, and one member, Charles O. Colton, have died. In addition to the 308 fellows and members, there are also 151 subscribers, a gain of 37 for the year, due largely to subscriptions from libraries and universities many of which are foreign. This is very encouraging and shows that the Journal of the Society is looked upon with increasing favor both nationally and internationally. A total of 459 paid copies of the *Journal* are mailed monthly, an increase of about 50 copies over last year. On account of the generous endowment by Colonel Roebling the financial condition of the Society has been very much improved since the last annual meeting.

Respectfully submitted,
FRANK R. VAN HORN, *Secretary*

REPORT OF THE TREASURER FOR 1926

Owing to the temporary absence of the Treasurer, the report was read by the Secretary. On motion it was accepted and ordered filed. On motion an auditing committee to be composed of non-members of the Council was appointed by the President. This committee consisted of Dr. L. S. Ramsdell and Dr. A. J. Walcott, and later reported to the Secretary that they found the books of the Treasurer correct.

To the Council of the Mineralogical Society of America: Your treasurer herewith submits his annual report for the year ending November 30, 1926:

RECEIPTS

Cash on hand December 1, 1925	$ 293.03	
Dues and subscriptions	1,510.64	
Advertisements	351.00	
Sale of back numbers	250.27	
Interest on bank deposits and endowment	2,294.12	
Miscellaneous	26.31	$4,725.37

Disbursements

Printing and distribution of the *Journal*................	$1,928.27	
Miscellaneous printing and stationery..................	36.36	
Postage..	41.74	
Miscellaneous....................................	14.39	
	$2,020.76	
BALANCE in Princeton Bank & Trust Company........	2,704.61	$4,725.37

Respectfully submitted,
Alexander H. Phillips, *Treasurer*

REPORT OF THE EDITOR FOR 1926

The report was read by the Editor, and on motion it was accepted and ordered filed. It was also moved, seconded and carried that the Editor be highly commended for his work and that he continue the policy of future development as outlined in his report.

To the Council of The Mineralogical Society of America:

The outstanding event of the year, insofar as its influence affects The American Mineralogist, was the generous endowment given the Society last February by the late Colonel Washington A. Roebling. The letter accompanying the gift contained the specific request that the whole or a part of the derived income should be devoted to the improvement of the monthly magazine, which in Mr. Roebling's estimation had been conducted on too narrow a margin.

Shortly after the announcement of this gift the members of the Society were invited to offer suggestions for improving the service of the Journal, now that a somewhat larger revenue was available. Quite a number of replies were received by the Editor. Some stressed the desirability of enlarging the size of the periodical with liberal allowances for cuts and illustrations; others were interested in the publication of a decennial index covering the first ten volumes; to some it seemed highly desirable to print the lists of fellows and members annually and furnish contributors a limited number of free reprints of their articles instead of entire issues as is the present custom; while from still other quarters came a rather persistent demand for replenishing our depleted stock of early issues.

While each of these suggestions has considerable merit, it is quite obvious that the funds available will not permit all of them to be undertaken immediately. The best solution, then, lies in an attempt to meet the most pressing needs first. Some progress has already been made in this direction. It may be stated that the Council is in full accord with a policy looking toward a gradual expansion in the size of the Journal, consistent, of course, with a standard that we have tried to maintain in the past. It may also be said that during the present year the authorities have followed a very liberal policy towards allowances for cuts and illustrations that appeared in the current volume.

Attention, however, should be directed at this time to two requests which I believe are of sufficient importance to warrant careful consideration by the Council before adjournment of the present session. These requests relate to the preparation of a condensed decennial index and the authorization of funds to provide for the reproduction of many of the early issues of the Journal. At the present time our files of the first five volumes are badly broken and we are unable to supply a single complete set for the years 1916–1920. There can be no question but that there is a growing demand, both here and abroad, for complete sets and if the MINERALOGIST is to properly serve its purpose it would seem that this shortage should be remedied as soon as possible.

In attempting an analysis of the present year we find that the volume for 1926 contains approximately 350 pages of text proper. Last year, due mainly to two special numbers which were largely financed through special appropriations, a somewhat larger volume was issued. But this year we paid our own way and the 350 pages of Volume 11 reveal an increase of 100 pages over the output of two years ago and represents the largest volume published to date that was paid for entirely from our own resources.

As requests have been received from time to time to increase the number of mineral locality articles, a special effort was made this past year to remedy this deficiency. A list of a number of the world's most noted mineral regions was decided upon and authors selected who seemed eminently qualified to discuss the region in question. A number of these foreign locality articles have made their appearance in the current volume—such as the mineral occurrence at Långban, and the description of the minerals from the Kola Peninsula. Issues now in press are continuing this series so that within a few months our readers will be furnished with résumés concerning the minerals from Mt. Vesuvius and Casapalca, Peru.

The current volume contains 57 leading articles or an average of nearly five per month and represents contributions received from 30 univerisities and research bureaus. This number seems to establish a new record and is especially gratifying in that it includes contributions from Sweden, Czechoslovakia and Russia as well as a number from Canada. It is hoped that the number of leading articles may be somewhat increased next year but if this hope is to be realized a larger number of manuscripts must become available. You are earnestly requested, whenever possible, to select THE AMERICAN MINERALOGIST as your medium of publication.

The 57 leading articles of the present year occupied 281 pages of text or about 82% of the total space, while the 8 book reviews, 22 reports of the proceedings of societies, 45 abstracted accounts of new minerals and 63 other items of general interest filled the remaining 61 pages or about 18% of the space of the Journal.

In regard to the future, I believe we are entering a new era and with the increased revenue now available it may be said that the Journal has become firmly established. If our readers will exercise some patience many of their wishes will be realized and if the manuscripts are forthcoming it should not be long before our annual output will fill a volume of approximately 500 pages.

The concluding table of contents summarizes the distribution of subject matter in Volume 11.

Distribution of Subject Matter in Volume 11

Subjects	*Articles*	*Pages*	*Percent of Total*
Original articles	57	281	82.1
Proceedings of societies	22	27½	17.9
Notes and news	63	14	
Book reviews	8	3⅔	
Abstracted accounts of new minerals	45	15⅚	
Total of text	195	342	100.0
Illustrations	56		
Covers, advertisements, index		82	
Total		424	

Respectfully submitted,

Walter F. Hunt, *Editor.*

REPORT OF THE COMMITTEE ON NOMENCLATURE AND CLASSIFICATION OF MINERALS

The report given was from the three members residing in Washington, D. C.—H. S. Washington, E. T. Wherry and W. F. Foshag—and was read by W. T. Schaller. The report was commented upon by E. S. Larsen, A. F. Rogers and T. L. Walker who were also on the committee. It was moved that the report be received and the committee be continued.

REPORT OF THE COMMITTEE ON PRESERVATION OF TYPE MATERIAL

The report was written by W. F. Foshag and read by W. T. Schaller. It was discussed by A. L. Parsons and A. N. Winchell, other members of the committee. It was moved to accept the report and continue the committee.

REPORT OF THE COMMITTEE ON HOLDING INTERNATIONAL MINERALOGICAL CONGRESSES IN COOPERATION WITH INTERNATIONAL GEOLOGICAL CONGRESSES

The report was written by Charles Palache and read by E. S. Larsen, and was discussed by T. L. Walker, another member of the committee. It was stated that several members of our Society had met in Madrid and had recommended to the Council of the International Geological Congress that a Mineralogical Section be formed. This will be acted upon by the Council of the next Congress.

NEW BUSINESS

The endowment fund of $45,000 given to the Society by Colonel Washington A. Roebling of Trenton, New Jersey, and the subsequent death of the donor were officially called to the attention of the Society. It was moved and carried that a committee of three be appointed to draft suitable resolutions to be sent to the family of Colonel Roebling. This committee consists of E. H. Kraus, A. H. Phillips, and R. B. Gage. A copy of these resolutions will be found in this issue.

It was also moved and carried that the Geological Society of America be requested to print advance abstracts of papers to be presented at the annual meeting of the Mineralogical Society, and that our members cooperate in placing such abstracts in the Secretary's hands in sufficient time to conform to the requirement of the Geological Society.

MEMORIAL BIOGRAPHIES

A memorial sketch of F. A. Canfield written by Charles Palache was read by E. S. Larsen. A memorial of Colonel W. A. Roebling was written and read by A. H. Phillips, and a biography of J. P. Wintringham, written by Thos. I. Miller, was read by Frank R. Van Horn. These memorials are printed in full in this issue.

RESOLUTIONS ON THE GIFT OF COLONEL W. A. ROEBLING TO THE MINERALOGICAL SOCIETY OF AMERICA

The record of gifts and benefactions to American educational and scientific institutions is long and impressive. The progress of education and science in America is due in no small measure to the thoughtfulness and generosity of such men as Rockefeller, Carnegie, Harkness, and hundreds of others. While no large sums of money have ever been given for the encouragement and development of the science of mineralogy, gifts of splendid mineral collections to our universities and museums have been a matter of rather frequent occurrence. In this connection we think at once of the gifts of Brush, Morgan, Bement, and many others. While these gifts contributed much to the development of outstanding mineral collections it remained for the late Colonel Washington A. Roebling of Trenton, New Jersey, to recognize the great service that the Mineralogical Society of America is rendering in the advancement of our knowledge of minerals. As a Fellow and former Vice-president of the Society he keenly sensed the financial handicap under which the organization and its official journal, THE AMERICAN MINERALOGIST, were laboring. In order that the Society, through its journal, might increase its effectiveness, in February, 1926, Colonel Roebling generously gave the organization the sum of $45,000.

Since Colonel Roebling, in conveying the gift to Professor A. H. Phillips, Treasurer of the Society, expressed the following wish:

"This gift is unconditional. I wish, however, that the whole, or part of it, be devoted to the publication of the monthly magazine, THE AMERICAN MINERALOGIST, which has been conducted on too narrow a margin."

Therefore, be it resolved:

That the Mineralogical Society of America formally accepts this generous gift of $45,000 of the late Colonel Washington A. Roebling, and

Be it further resolved:

That since the donor has expressed the hope that these funds be largely used for the encouragement of the publication of mineralogical papers through the expansion of THE AMERICAN MINERALOGIST, the Society pledges itself to carry out these wishes, and

Be it further resolved:

That the sincere thanks and deep appreciation of the Society for this splendid gift be conveyed to Colonel Roebling's son, Mr. John A. Roebling, and through him to the members of the Roebling family.

(Signed) W. T. SCHALLER
A. H. PHILLIPS
R. B. GAGE
E. H. KRAUS, *Chairman*

PRESENTATION OF PAPERS

There being no further business, the Society proceeded to the reading of scientific papers. The papers presented with short abstracts follow.

A. N. WINCHELL: *Notes on the Triclinic Pyroxenes.* The "Triclinic Pyroxenes" include several minerals whose formulas and mutual relationships are still uncertain. This group consists of metasilicates of manganese (with or without iron and magnesium) and calcium in which the ratio between manganese and calcium seems to vary from 1 :0 to 1 :1. However these minerals differ too much optically and crystallographically to belong to an isomorphous series in the narrow sense of that term. The correct formula of rhodonite is not $MnSiO_3$, but probably $CaMn_5(SiO_3)_6$.

JOHN T. LONSDALE and W. S. ADKINS: *Euhedral Orthoclase Crystals from Sierra Blanca, Texas.* Near Sierra Blanca in Trans-Pecos, Texas, a dike of feldspar porphyry is exposed cutting Cretaceous limestone. Through disintegration the phenocrysts of the dike are made available to the collector in great abundance. The paper describes the crystal forms found and gives the chemical composition and optical constants of the crystals.

* * *

At 4 P. M. the Society adjourned and met immediately afterward in joint session with the Geological Society before which the presidential address by Dr. W. T. Schaller on, "*Mineral Replacements in Pegmatites*," was given. This paper is printed in full in this number. Following this address papers of mineralogic and petrographic nature were presented, and the joint session adjourned at 5:55 P. M.

On Tuesday, December 28, at 9:15 A. M. President Schaller called the second session of the Society to order and the reading of papers proceeded according to program.

WALDEMAR T. SCHALLER: *The Origin of Texas and New Mexico Polyhalite.* The polyhalite from Texas and New Mexico was probably not formed directly by precipitation from sea water, but is a secondary product resulting from reactions and replacements in an already deposited sea formation of anhydrite and kieserite.

CHARLES PALACHE and L. H. BAUER: *Cahnite, A New Boro-Arsenate of Calcium from Franklin, New Jersey.* Cahnite is the name proposed for a mineral crystallized in tetragonal sphenoids characteristically occurring in interpenetrating twins. The mineral is white and glassy, about 3 in hardness and 3.15 in specific gravity. An excellent prismatic cleavage is taken as the first order prism. Refractive index is about 1.662. The chemical analyses made by Bauer yield results closely corresponding to the formula $4CaO \cdot B_2O_3 \cdot As_2O_5 \cdot 4H_2O$. It is associated with axinite, rhodonite, willemite, hedyphane, friedelite, barite, and datolite in various combinations.

It was named in honor of Mr. Lazard Cahn, of Colorado Springs, who first identified the minute crystals as a distinct mineral.

Charles Palache and Lyman W. Lewis: *Crystallography of Azurite from Tsumeb, Southwest Africa, and the Axial Ratio of Azurite.* This study was made on a collection of over 1500 specimens from the Tsumeb mine, containing azurite crystals or malachite pseudomorphs after azurite. Fifteen habits of azurite and malachite pseudomorphs are described and illustrated. The following axial elements, differing materially from those determined by Schrauf, and used by Dana, Goldschmidt, and Groth, were derived from measurements made on many excellent crystals—$a:b:c = .8565:1:.8841\ \beta = 87°\ 35'$. Comparison with the elements derived by other authors, and additional measurements on azurite from Bisbee, Ariz.; Broken Hill, Australia; Kelly Mine, N. M.; Laurion, Greece; and the original Chessy, France locality corroborates the results obtained on the Tsumeb crystals, and an angle table, calculated for all reported forms, is included.

Harry Berman: *The Optical Properties of Zincite.* An optical study of an exceptionally pure analyzed zincite from Franklin, N. J. A curve is given showing the relation between the index of refraction and the wave length of light, and illustrating the dispersion formula of J. Hartman. The "specific refractive energy" constant for zinc oxide is determined from the observed data, according to the formula of Gladstone and Dale.

Victor T. Allen: *Ionite, a Hydrous Silicate of Aluminum.* The name *Ionite* is proposed for a mineral having the composition $5H_2O \cdot 2Al_2O_3 \cdot 6SiO_2$ and forming an important part of the Ione formation of California. Evidence is given which indicates it is formed from biotite or chlorite by the loss of Mg, Ca, Fe, and alkalies and with corresponding increase in water. Chemical analyses and optical data are given. An explanation for the occurrence of rutile in clays is offered.

Charles A. Anderson: *Voltaite from Jerome, Arizona.* Crystals of the rare mineral voltaite were sent to the Department of Geological Sciences, University of California, from the upper levels of the United Verde Mine, Jerome, Arizona. They seemingly were formed by sulphur vapors from burning sulphide ore. The paper describes the crystals and includes a chemical analysis. The crystals alter rather quickly on exposure to the air, forming coquimbite and copiapite.

George L. English: *The Scientific Valuation of Minerals.* Proficiency in valuation is of much importance to the curator of minerals in every museum and to every collector who buys minerals. Their scientific appraisal was treated under the following heads: (1) Commercial value. This frequently differs greatly from the scientific value. Among the illustrations noted were gold nuggets, platinum and dioptase. (2) Chemical composition. This is important in minerals of high commercial value, rare-earth minerals and those with several acid radicals or rare radicals. (3) Form. The valuation of simple, complex and distorted crystals and imitative forms was discussed. (4) Miscellaneous characteristics. Theoretically beauty is not a factor in scientific valuation, practically it is of immense importance. Hardness contributes much to the value of abrasives and gems. Size, within certain limits, controls values. (5) Rarity. The law of supply and demand operates inexorably in the valuation of minerals. A table for the valuation of minerals was proposed.

T. L. Walker and A. L. Parsons: *Tremolite Crystals from Faraday Township, Ontario.* Crystals of tremolite measuring up to 100×60×76 mm were obtained from the sod and soil overlying a deposit of crystalline limestone in Faraday township, Hastings county, Ontario. Forms present, *a*(100), *b*(010), *c*(001), *m*(110), *e*(130), *r*(011), and *y*(132) (new). Smaller crystals showed with the reflection goniometer the following additional forms: (150), (210), (410) (new but doubtful), (230) (new), (250) (new). Analysis is given.

T. L. Walker and A. L. Parsons: *Stromeyerite from Gowganda, Ontario.* A massive mineral from the Morrison mine in Gowganda is characterized by a metallic lustre, molybdenite blue color, and conchoidal fracture. The analysis shows that it is almost theoretically pure stromeyerite, $Cu_2S \cdot Ag_2S$. This is the first occurrence of this mineral in Gowganda, but it was found in the Cobalt district in the early days.

T. L. Walker and A. L. Parsons: *Hexahydrite from Oroville, Washington.* Hexahydrite ($MgSO_4 \cdot 6H_2O$) was found as an alteration product on a deposit of epsomite at Oroville, Washington. The same substance formed when epsomite was exposed to dry air under museum conditions but in a humid atmosphere again regained the water which was lost.

T. L. Walker and A. L. Parsons: *Beryl and Associated Minerals from Lyndoch Township, Renfrew County, Ontario.* Crystals of beryl from Lyndoch township, Renfrew county, Ontario exhibit the forms *a*($10\bar{1}0$), *p*($10\bar{1}1$), *s*($11\bar{2}1$), and *c*(0001) and are almost identical in development with those found on the Urulga river. The analysis agrees well with Penfield's formula for beryl $(R_2^{I} \cdot R^{II})\,O.6BeO \cdot 2Al_2O_3 \cdot 12SiO_2$. The associated minerals are orthoclase, green microcline, albite, white and pale rose quartz, garnet, black tourmaline, columbite, and magnetite.

Lewis S. Ramsdell: *X-Ray Data on Some Sulfide Minerals.* X-ray diffraction data indicate that linnaeite (Co_3S_4) is a definite cobalto-cobaltic sulphide, analogous to magnetite, and that polydymite (from Vermilion mine) is distinct from pentlandite. The identity of temiskamite with maucherite is verified, as well as the fact that some so-called cubanite is a mixture of chalcopyrite and pyrite. Analysis of artificial material similar to smaltite shows it to be nearer Co_2As_5 than $CoAs_2$. Artificially prepared pure $PtAs_2$ is identical with sperrylite, and the edge of the unit cube is 5.96 A. U. Stannite is structurally similar to chalcopyrite, with one-half of the Fe replaced by Sn. Excess S in pyrrhotite is accompanied by a decrease in the size of the unit cell and lower density, which indicates a replacement of Fe by S rather than an addition of extra S.

W. V. Howard: *The Evolution of the Odd-Numbered Elements.* In 1917, W. D. Harkins called attention to the fact that by far the larger proportion of the material which goes to make up the earth consists of the even-numbered elements and that it is only upon the surface that there is more than a very small percentage of odd-numbered elements, mainly sodium, potassium and aluminum. He also pointed out that the elements immediately following these odd-numbered elements, namely magnesium, calcium, and silicon were present in much larger abundance, taking the earth as a whole. Aston's more recent work on isotopes has shown that so far as is known, nearly all odd-numbered elements are made up of one or two isotopes whose mass-numbers differ by one from those of the lowest isotopes of the even-numbered element immediately following. This suggests that by a process of disintegration the lowest isotopes of the even-numbered elements have formed the odd-numbered elements and that one proton and one electron have been given off which have united to form an atom of hydrogen. This hydrogen, in turn, has combined with the oxygen set free owing to the lower valence of the newly formed elements to form water. If this hypothesis can be shown to be valid, it will account for many facts which are difficult to explain at present. Among these are such questions as the source of juvenile waters, the causes of the rise of magmas to the surface and the formation of granitic magmas.

W. A. Tarr: *Alternating Deposition of Pyrite and Marcasite.* Pyrite and Marcasite occur in intimate association with each other in a number of localities in Missouri. They may be intergrown and deposited on the same surface or they may be deposited in alternating layers of variable thickness. This association indicates that the range in the physical conditions surrounding deposition, i. e. temperature and character of the depositing solution, is rather narrow. These conditions are discussed for the particular occurrence.

W. A. Tarr: *The Sulfide Inclusions of Joplin Calcites.* This paper was read by title.

J. J. Runner: *Spherulites in Fossil Wood.* A specimen of silicified wood from the Lakota formation of western South Dakota contains numerous spherical structures composed of radiating needles of quartz and exhibiting a pronounced concentric banding. The structures bear marked resemblances to some sedimentary oolites as well as to the spherulites of igneous rocks.

J. J. Runner: *Primary Scapolite in Granite Pegmatites.* Scapolite intergrown with quartz, apatite, and muscovite, and containing minute inclusions of quartz, muscovite, graphite, and calcite occurs within the Harney Peak Granite batholithic mass in the Black Hills of South Dakota. Feldspars are absent in this portion of the rock. The area is well within the granitic core and several miles from the sedimentary border. No inclusions were noted in the vicinity. The scapolite is believed to have been formed as the result of assimilation of limestone xenoliths.

Stephen Richarz: *Grünerite and Grünerite Rocks of the Lake Superior Region.* The grünerites of the Marquette iron district were analyzed and their optical properties determined. They display the characteristics of grünerite, but chemically and optically they differ considerably from the French material. The percentage of ferrous iron is lower, that of MgO higher. Accordingly, refraction and birefringence are lower. The French grünerite studied by St. Kreutz is intermediate, both in chemical and optical properties. The original rocks from which grünerite must be derived is cherty siderite in Michigan, greenalitic chert in Minnesota. The metamorphism is apparently caused by the adjacent eruptives which are "greenstones" in Marquette district, Duluth gabbro in Mesabi Range. Grünerite represents the highest state of metamorphism, the lower stage forms micas and chlorites. Neither deep-seated nor dynamic metamorphism is required; contact metamorphism alone explains the facts satisfactorily.

* * *

The Society adjourned for lunch at 1 P. M. and at 2:15 P. M. assembled for the third session, and immediately proceeded with the final papers on the program.

EDWARD H. KRAUS: *The Manufacture of Synthetic Rubies and Sapphires.* Artificial rubies and sapphires are now manufactured in large quantities and used extensively for gem and various industrial purposes. The methods of manufacture and various interesting properties of the uncut manufactured material will be described. The location of the principal plants with the estimated daily output will be given.

EDWARD H. KRAUS: *Gem Cutting at Idar-Oberstein.* After a brief discussion of the development of agate cutting in this district, which dates back at least to the fifteenth century, the methods employed today will be described. There are several groups of workers, (a) gem cutters who use primitive sandstone wheels and cut softer minerals including those of the quartz group, (b) lapidaries who use more modern methods and usually cut the harder stones, (c) diamond cutters, (d) engravers, another group specializes in color improvement and have developed methods whereby the color of the raw material may be improved or even changed. Oberstein, being on the railroad, is commonly referred to as the seat of this agate and gem cutting industry. However, the principal center is the adjoining village of Idar.

CHARLES PALACHE and LYMAN W. LEWIS: *A Saw Attachment Adapting Goldschmidt's Model Cutting Machine to the Sawing of Wooden Models.* This attachment consists of a circular saw cutting a very smooth surface, attached to the axis of a one-eighth horse power electric motor. The saw and motor, the former protected by a guard, are mounted on a plate which slides on the runners carrying the cutting knife on the original Goldschmidt plaster-model cutting machine. The wooden block to be cut is held by a screw chuck. The new parts are simply substituted for removable parts of the original machine so that it can still be used for cutting plaster models. The machine permits the cutting of complete models doubly terminated, of simple forms, such as pyramids or the dodecahedron. When the terminations are complex, complete models may be produced provided there is a prism zone. The prism zone is first sawed to the full length of the desired model. One end is then developed and cut off; the other end is then cut with proper adjustment of the ϕ angles and the two ends are then glued together. The results are accurate and satisfactory and the work proceeds more rapidly than with plaster.

WALDEMAR T. SCHALLER: *Kernite, A New Sodium Borate Mineral.* It is colorless, and transparent; cleavage piece from Kern County, California, has the composition of borax but with only $4H_2O$. The formula is, $Na_2O \cdot 2B_2O_3 \cdot 4H_2O$. This hydrate is not known artificially. It is orthorhombic, and has a specific gravity of 1.95, and a mean refractive index of 1.47. It occurs in thick deposits covering large acreage.

AUSTIN F. ROGERS: *Anauxite Crystals from Two Western Localities.* Euhedral crystals of anauxite, $3Al_2O_3 \cdot 10SiO_2 \cdot 8H_2O$, from two localities, one near Jamestown, Tuolumne County, California, the other 35 miles west of Tucson in Pima County, Arizona, are described. The crystals are minute, pseudo-hexagonal, biaxial crystals of thin tabular habit. It is probably orthorhombic. In both localities they occur in cavities of an augite andesite associated with cristobalite paramorphs after tridymite.

AUSTIN F. ROGERS: *A Tabulation of the Thirty-two Crystal Classes.* If Groth's arrangement of the 32 classes is modified by placing the trigonal bipyramidal class after the hexagonal scalenohedral class we have a convenient arrangement in which the order of the classes is only in minor part arbitrary. In the new arrangement, the subgroups of each group appear before the group itself. Another reason for the change is that the trigonal bipyramidal and ditrigonal bipyramidal classes belong to the hexagonal subsystem (or hexagonal system proper if seven systems are used) and not to the trigonal system of Groth, Tutton and others or the trigonal or rhombohedral division or subsystem of the hexagonal system of Dana and others. The symmetry elements of crystals include: axes of 2-fold, 3-fold, 4-fold, and 6-fold symmetry, center of symmetry, plane of symmetry, 4-fold axis-plane, 6-fold axis-plane, and 6-fold axis-center of symmetry. The symmetry relations of crystals are conveniently studied by means of the mathematical theory of groups.

CHESTER B. SLAWSON: *The Frederick Stearns Collection of Gem Minerals.* This paper was read by title.

R. E. LANDON: *Roemerite from California.* Rare sulphate of iron, roemerite, $FeO \cdot Fe_2O_3 \cdot 4SO_3 \cdot 12\text{–}15H_2O$, occurs in abundance at the pyrrhotite deposit at Island Mountain, California. A description of the crystals, chemical analysis and optical properties are given in the paper.

JOSEPH L. GILLSON: *The Granite of Conway, New Hampshire and its Druse Minerals.* A vertical sheet of miarolytic cavities and small pegmatite lenses occur in the granite of Conway, New Hampshire, exposed in the building stone quarry known as the "Redstone Red" at Red Stone, N. H. In the granite away from this sheet of cavities and lenses several of the same minerals occur as deuteric constituents. Thus the relation of deuteric minerals to the minerals of miarolytic cavities and pegmatites is demonstrated in this case. The identity and paragenesis of the deuteric minerals and those found in the druses and pegmatites was determined in order to study the character of the post-consolidation mineralizing solutions. The important features of the minerals are described.

R. C. EMMONS, (introduced by A. N. Winchell): *Immersion Liquids for the Dispersion Method of Mineral Determination.* A set of liquids has been selected to afford the best results when employing variable temperature and variable wavelength illumination in studying the indices of mineral grains in immersion oils. Each liquid has a high temperature coefficient, a high dispersion and, so far as possible, a high boiling point. Mixtures have been avoided in order to insure a constant index for a particular liquid.

CHARLES PALACHE and E. V. SHANNON: *Holdenite, a New Arsenate of Manganese and Zinc from Franklin, New Jersey.* This mineral was found on a slab of massive franklinite in the collection of A. F. Holden at Harvard and was named for him. It occurs in orthorhombic crystals which are tabular parallel to the macropinacoid. It has a pink to red color, and is a very basic arsenate of manganese and zinc with the formula, $12R^{II}O \cdot As_2O_5 \cdot 5H_2O$ in which the R^{II} is principally manganese and zinc in the ratio of nearly 2:1.

* * *

The last paper was finished at 5:10 P. M. after which it was moved that the thanks of the Society be extended to the local committee, to the authorities of the

University of Wisconsin, and to the Wisconsin Geological and Natural History Survey for their kindness and hospitality. This was seconded and unanimously adopted, after which the Society adjourned. At this meeting three memorial biographies, and thirty-two scientific papers were presented, two being read by title. This was the longest program ever given before the Society. Fifty fellows, members and guests attended the meeting.

The following fellows, members, and visitors registered at the meeting: V. T. Allen, H. L. Alling, W. S. Bayley, E. L. Bruce, Miss Ferga Carmichael, C. W. Cook, A. R. Crook, G. L. English, W. C. English, Miss Erb, C. R. Fettke, D. J. Fisher, A. S. Furcron, J. L. Gillson, T. L. Gledhill, E. P. Henderson, W. F. Hunt, G. L. Knight, E. H. Kraus, K. K. Landes, R. E. Landon, A. C. Lane, E. S. Larsen, J. T. Lonsdale, J. H. C. Martens, E. B. Mathews, P. T. Miller, A. L. Parsons, A. H. Phillips, L. S. Ramsdell, Stephen Richarz, H. Ries, A. F. Rogers, E. P. Rothrick, J. J. Runner, R. L. Rutherford, Edward Sampson, W. T. Schaller, Edward Steidtman, C. H. Stockwell, M. H. Stow, W. A. Tarr, Ellis Thomson, D. W. Trainer, Jr., F. R. Van Horn, Otto von Schlichten, A. J. Walcott, T. L. Walker, L. G. Westgate, A. N. Winchell, M. E. Wing.

HONORARY LIFE FELLOWS OF THE MINERALOGICAL SOCIETY OF AMERICA

Friedel, A., Univ. of Strassburg, Strassburg, Alsace, France.
Goldschmidt, Victor, Univ. of Heidelberg, Heidelberg, Germany.
Groth, Paul, Univ. of Munich, Munich, Germany.
Lacroix, A., Museum of Natural History, Paris, France.
Spencer, L. J., Natural History Museum, South Kensington, London, S. W. 7, England.

FELLOWS OF THE MINERALOGICAL SOCIETY OF AMERICA[1]

(*Indicates charter fellow. †Indicates charter member before election to fellow.)

*Adams, Elliot Q., Pure Science Lab., Nela Park, Cleveland, Ohio.
Alling, Harold L., 901 East Ave., Rochester, N. Y.
†Anderson, Charles, Australian Museum, Sydney, New South Wales, Australia.
*Ashcroft, Fred'k Noel, 1 Egerton Gardens, South Kensington, S. W. 3, London, England. [Life Fellow].
*Bascom, Miss F., Bryn Mawr College, Bryn Mawr, Pa.
*Bayley, William S., Dept. of Geology, Univ. of Illinois, Urbana, Ill.
Bøggild, O. B., Univ. of Copenhagen, Copenhagen, Denmark.
*Bowen, N. L., Geophysical Laboratory, Washington, D. C.
*Bowles, Oliver, U. S. Bureau of Mines, New Brunswick, N. J.

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[1] The names and addresses here listed are those on record January 1, 1927. Any omission or correction should be sent to the Secretary, Prof. Frank R. Van Horn, Case School of Applied Science, Cleveland, Ohio.

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Buddington, Arthur F., Dept. of Geology, Princeton University, Princeton, N. J.
Burbank, Wilber S., U. S. Geological Survey, Golden, Colorado.
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PROCEEDINGS OF SOCIETIES

PHILADELPHIA MINERALOGICAL SOCIETY

Academy of Natural Sciences of Philadelphia, Jan. 6, 1927.

A stated meeting of the Philadelphia Mineralogical Society was held on the above date with the president, Mr. Vaux, in the chair. Twenty-two members and nine visitors were present.

Mr. F. A. Cajori addressed the Society on "*Some mineral localities in the Pike's Peak region.*" After a brief description of the region the following well-known localities were discussed in detail: Crystal Peak near Florissant where the finest of the Pike's Peak amazonstone was found; the pegmatites of St. Peter's Dome characterized by the presence in them of the soda-rich amphibole, riebeckite, and other unusual minerals; and lastly the Cripple Creek mining district. The speaker gave a short history of mining in Cripple Creek and described the mode of occurrence of the gold and associated minerals. The talk was illustrated with views and maps of the region and minerals from the localities described.

F. A. Cajori, *Secretary*

NEW YORK MINERALOGICAL CLUB

Regular Monthly Meeting of October 20, 1926.

A regular monthly meeting of the New York Mineralogical Club was held in the East Assembly Room of the American Museum of Natural History on the evening of October 20, 1926. The Committee on Membership reporting favorably on Mr. Conrad Moeller, he was declared elected to membership on a ballot cast by the Secretary.

The following names were submitted for membership by the Secretary:—Mr. K. D. Perkins, 285 Madison Avenue, N. Y. City; Mr. Joseph Quinn, Amer. Museum of Natural History, N. Y. City; and Dr. H. R. Blank, Columbia University, N. Y. City. The secretary moved that in view of the fact that one of these candidates was already a member of the N. Y. Academy of Sciences, and that the other two were well known to many members of the club, that their names be submitted forthwith to the committee. This motion being carried and the Chairman reporting favorably from the floor on the names submitted, the President instructed the Secretary to cast one ballot for these candidates who were declared duly elected.

Mr. F. I. Allen reporting for the Committee on Constitution submitted a draft of the constitution which he then read. It was moved that the constitution be adopted as a whole. Mr. Weidhaas raised a point as to the notification of members not present at a meeting on which an amendment to the Constitution was proposed. Mr. Stanton then moved to amend the Constitution in Article IX to read in addition "notice shall be given of the intention to amend the constitution." This motion to amend the Constitution was lost.

Motion that the constitution as submitted by the Committee be adopted was unanimously carried. A motion that a vote of thanks be tendered to the Committee for their painstaking work on the Constitution was also unanimously carried.

Taking up the matter of the Election Day field outing, Mr. Hoadley suggested that the Club visit the West Paterson and Prospect Park Quarries, and that Mr. Morton be appointed guide for the excursion. The motion was carried.

On a motion to extend the meeting to include the summer collecting excursions of the members present being carried, Mr. Hoadley described a trip made with Mr. Radu and Mr. Biernbaum of Philadelphia to the Maine localities. He spoke of their visit to Paris, Noyes Mountain, Bennett's Lodge and the Buckfield locality for beryl, siderite, rhodochrosite and columbite. Lepidolite and other pegmatite minerals were collected from the Hebron locality. At Grafton they saw a large beryl in place which measured 40 inches from prism to prism, and projected 36 inches. They visited Alstead and Gilsum for garnet and torbernite. They also visited the Strickland, Hall and Gillett quarries in the vicinity of Haddam and attempted to find the danburite locality at Danbury.

Mr. Cahn spoke of the discovery of rhodochrosite in Park County, Colorado, and of the finding of the rare nickel telluride, melonite, at Cripple Creek. Mr. F. I. Allen spoke of the new quarry at Bedford as producing a yellow mineral which proved to be goethite.

HERBERT P. WHITLOCK, *Secretary*

Regular Monthly Meeting of November 17, 1926.

A regular monthly meeting of the New York Mineralogical Club was held in the East Assembly Room of the American Museum of Natural History on the evening of November 17, 1926. The President, Dr. Paul F. Kerr, presided and there was an attendance of 33 members.

The Secretary read a letter from Mr. Manchester in which he resigned from the office of delegate to the Council of the New York Academy of Sciences. The Secretary pointed out that representatives on this Council from the Affiliated Societies are usually chosen from among Fellows of the Academy, and moved that the President appoint such a delegate. After some discussion this appointment was laid on the table until a subsequent meeting.

The name of the Rev. O. S. Schreiber of 2681 Boulevard, Jersey City, was submitted to the Committee on Membership, and on a motion by the President the Chairman of the Membership Committee was asked to report on this nomination from the floor. Mr. F. I. Allen pointed out that such action should not create a precedent since the Constitution provided for the admission of candidates for membership in a stated manner, but waived the regular procedure in this instance. The Rev. O. S. Schreiber was unaminously elected to membership in the Club.

Mr. Morton spoke of the Election Day field meeting as eminently successful. He noted the following minerals found on that occasion:

From the West Paterson quarry: calcite, quartz, pectolite, prehnite, chabazite, datolite, laumontite, diabantite and thomsonite. From the Prospect Park quarry: calcite, quartz barite, prehnite, datolite, pectolite, laumontite, diabantite and chrysocolla. The familiar "casts" in various minerals were found in both quarries.

The President announced the death upon this day of Professor James F. Kemp, a highly distinguished member of the Club. He spoke of the great loss sustained by the Club and read the following resolution to be incorporated in the records and a copy sent to Mrs. Kemp:—

> The New York Mineralogical Club wishes to take this occasion to express the sympathy which it feels for Mrs. Kemp in her loss of Professor Kemp. The loss we acknowledge to be one in common for although an economic geologist by profession few men have ever shown a keener love and appreciation of minerals than Professor Kemp.
>
> He has always taken a keen delight in their scientific study and has been an ardent collector giving pleasure to others with the many beautiful specimens that he secured. At one time a teacher and student of mineralogy, he retained the interest in the subject throughout his life. It is with keen regret that we learn of his having been taken from our midst, a regret tempered only by our knowledge of the unusual productivity of the life which he lived.

It was moved that the Secretary arrange for the printing and distribution to members of the Club of copies of the Constitution.

Proceeding to the papers arranged for the meeting, Dr. Horace R. Blank of Columbia University addressed the Club on the *"Chemical Cleaning of Mineral Specimens."* He pointed out that the process usually involved the removal of one mineral in order that the other may be seen to better advantage. The limonite which frequently encrusts quartz may be removed by 1:1 HCl, the addition of tartaric acid in proportions of about one-fifth will prevent an iron stain from appearing after the specimen has been washed. Washing should be done with a hot solution of tartaric acid. Rhodonite may be freed from the calcite which so often accompanies it by weak HCl, but willemite and chondrodite will not admit of this treatment. Tarnishes on sulphides may be removed by immersing for a few days in cold tartaric acid; this treatment is particularly successful for stibnite. Galena may be cleaned with a heated solution of ammonium acetate.

At the close of his paper a vote of thanks was tendered to Dr. Blank for his valuable suggestions. Mr. Whitlock, speaking on *"A Novel Idea in Locality Collections"* described the way in which the specimens from Roumanian localities were distinguished in the main collection by colored markers as featured in the temporary exhibit recently installed. The Club was invited to view this installation in Morgan Hall. The Roumanian specimens were marked by narrow strips of the Roumanian colors (red, orange and blue) and small shields in the same colors on the glass of the case directed attention to the points in the series where these were to be found. A group label reads: "This collection contains a number of minerals from Roumania scattered through the cases. Look for the Roumanian colors (follow a colored shield) and you will find them.

HERBERT P. WHITLOCK, *Secretary*

Regular Monthly Meeting of December 15, 1926.

A regular monthly meeting of the New York Mineralogical Club was held in the East Assembly Room of the American Museum of Natural History on the evening of December 15, at 8.15 P. M. The President, Dr. Paul F. Kerr, presided and there was an attendance of 16 members. The President appointed Mr. Whitlock as delegate from the Club to the Council of the New York Academy of Sciences, to fill the vacancy left by the resignation of Mr. Manchester.

The Secretary submitted the name of Mr. William E. Belanski, 1230 Fulton Avenue, New York City for membership to the Committee on Membership. The Secretary read a letter received from Dr. Roy W. Miner, Secretary of the N. Y. Academy, urging members of the Club to attend the annual dinner of the Academy on December 20th. Reverting to the lamented death of Professor James F. Kemp, reported at the November meeting, the Secretary read an appreciation of Dr. Kemp by his associate Professor Charles P. Berkey, which appeared in a recent issue of the Columbia Alumni News. Mr. F. I. Allen moved that the sentiment expressed in this appreciation be embodied in the minutes as expressing the sentiment of the Club. Mr. Allen also spoke of Dr. Kemp's geological work in the Adirondacks.

Proceeding to the "*Symposium on the Feldspars*," which was announced as the program for the meeting, the President introduced the subject for discussion. Mr. Hoadley exhibited specimens of cassinite from Blue Hills, Pa., hyalophane from Franklin, N. J., chesterlite from Poor House Quarry, Chester Co., Pa., oligoclase and albite from Amelia Court House, Va., moonstone and microcline from Valhalla, N. Y., oligoclase from Fine, N. Y., moonstone from Mineral Hill, Pa., sunstone from Newlin, Pa., albite pseudomorphs after microcline from Branchville, Conn., microcline from Leiper's Quarry, Pa., and a number of feldspars from foreign localities.

Mr. Manchester showed microcline and albite from Bedford, N.Y., also rutile and limonite pseudomorphs after pyrite, and amazon-stone and peristerite from Valhalla, N. Y. Mr. Weidhaas showed orthoclase from Bedford and from Madagascar, microcline from Pitcairn, N. Y., amazon-stone from Colorado, albite from Branchville, Conn., cleavelandite from Bedford, N. Y., oligoclase from St. Lawrence Co., N. Y., sunstone from Norway, labradorite from Labrador and cymatolite from Branchville, Conn.

Mr. Whitlock exhibited microcline from Wolf Creek, Montana, showing twins according to Carlsbad and Baveno laws and discussed the twinning of orthoclase and microcline.

HERBERT P. WHITLOCK, *Secretary*

NOTES AND NEWS

The late Col. Washington A. Roebling's private collection of 16,000 mineral specimens has been given by his son, Mr. John A. Roebling, to the Smithsonian Institution of Washington, D. C. Accompanying the gift is an endowment of $150,000 to insure its maintenance. A short time ago the Smithsonian Institution likewise came in possession of the Frederick A. Canfield collection of 9,000 specimens, together with an endowment of $50,000. These two gifts added to the 50,000 mineral specimens already owned by the Smithsonian places this Institution, from the standpoint of mineralogical material, in a class with the British and Vienna Museums.

The Roebling collection is unique in many ways. According to *Science*, (Jan. 21 1927, p. 55) it contains a greater number of species than any other collection, public or private, in the world. Of the 1,500 firmly established mineral species the Roebling collection lacked less than 15 of these. A list of a few of the unusual specimens would include: a 64 carat black diamond from S. Africa; 9 Arkansas diamonds, including one of 18 carats; a black opal from Humboldt Co., Nevada, weighing more than a pound (18 6/10 oz.), considered the largest precious opal known, and a 45 pound topaz crystal. Among the cut stones is a 319 carat peridot from the island of Saint John in the Red Sea; a wine colored topaz from Brazil weighing 93 carats and an alexandrite of 32 carats from Ceylon.

* * * *

Dr. Ralph W. G. Wyckoff, formerly of the Geophysical laboratory of the Carnegie Institution, Washington, D. C., has been appointed to the staff, division of biophysics, of the Rockefeller Institute for Medical Research, New York.

Julius Goldman, of the New York banking firm of Goldman, Sachs and Co., has given $10,000 to Johns Hopkins University for research in geology.

Dr. A. C. Hawkins, formerly of the University of Rochester, department of geology and mineralogy, has been appointed to the staff of Rutgers College, New Brunswick, New Jersey.

Professor Chas. R. Fettke, of the Carnegie Institute of Technology, has been appointed Honorary Curator of Mineralogy at the Carnegie Museum, Pittsburgh, Pa.

Dr. William D. Coolidge of the research laboratory of the General Electric Company who was awarded the Edison Medal for 1926 "for the origination of ductile tungsten and the fundamental improvement of the X-ray tube", has declined to accept the medal. The reason given was that a court decision maintained that the discovery of the cold ductility of the metal was not an invention and that, therefore, the patent was void.

In the December issue of The American Mineralogist, p. 341, (last item under Notes and News) the printer, in his anxiety to have the issue appear before the annual meeting, omitted the surname Kemp. The notice should, of course, read Professor James Furman Kemp of Columbia University.

The memorial of Professor W. L. Uglow was not received in time for publication in this issue. It will appear in a later number of the Journal.

NEW MINERAL NAMES

Traversite

A. Amstutz: Les Roches éruptives des environs de Dorgali et Orosei en Sardaigne. (The eruptive rocks of Dorgali, Orosei and vicinity in Sardinia). *Schweiz. Min. Petr. Mitt.*, 5, 301, 1925.

Name: After the locality, *Traversa*, Sardinia.

Physical and Optical Properties: Color dark brownish red. Cleavage (100), good. 2V about 90°. Pleochroism weak. Refringence and birefringence less than the olivene. Z of the traversite = Y of olivene, Y = Z, X = X.

Occurrence: Found as an alteration product of the olivene of the basalts at Traversa, Sardinia.

Discussion: See remarks under oroseite.

W. F. Foshag

Oroseite

Ibid. p. 307.

Name: After the locality *Orosei*, Sardinia.

Physical and Optical Properties: Color red brown, 2V variable, next to the olivene 30°, at the outside border 90°. Birefringence = .020. n is equal to or slightly lower than the olivene. Cleavage (100), good. Z of oroseite = X of the olivene, Y = Z, X = Y.

Occurrence: An alteration product of olivene in the basalts of Orosei, Sardinia.

[Without doubt both of these names represent the already well known mineral iddingsite! Abstr.]

W. F. F.

Dienerite

O. Hackl: Ein neues nickel-arsen mineral. (A new nickel arsenide). *Verh. Geol. Rchs-Anst. Wien.*, p. 107-108, **1921**. Also C. Doelter: *Handb. Mineralchemie*, vol. **4**, 1st half, p. 718–719.

Name: Name given by C. Doelter in honor of Prof. C. *Diener* who found the mineral.

Chemical Properties: An arsenide of nickel. Formula: Ni_3As. Analysis: As 30.64, Ni 67.11, Cu 0.99, Fe 0.61, Co 1.29, Ag 0.01655; sum 100.66.

Crystallographical Properties: Cubic.

Physical Propertifs: Color white with tinge of gray, bright metallic luster.

Occurrence: A single cubic crystal ½ cm. along its edge found near Radstadt in Salzburg, Austria.

W. F. F.

Usbekite

Ivan Kurbatkoff: Über vanadium verbindungen und das neue mineral "Usbekite" der radioaktiven Lager in Fergana. (Vanadium compounds and a new mineral Usbekite from Fergana). *Centr. Min.*, **1926**, pp. 345–353.

Name: Derivation not given..

Chemical Properties: A hydrous copper vanadate. Formula: $3CuO \cdot V_2O_5 \cdot 3H_2O$. Analysis: H_2O (−) 0.53, H_2O (+) 12.82, MgO tr., CaO 0.31, CuO 44.69, NiO 0.90, $Al_2O_3 + Fe_2O_3$ 1.40, SiO_2 1.17, V_2O_5 37.71; sum 99.53. Soluble in acids.

Physical Properties: Color dark green.

Occurrence: Found as a crust of very fine scales on siliceous schist at Kara-Tschagir, Fergana.

W. F. F.

Mangan-neptunite

S. M. Kurbatov: *C. R. Acad. Sc. Russie*, p. 59, **1923**.

A. E. Fersman, *Trans. Northern Sc. Econ. Exped.*, No. **16**, pp. 16, 69, 73, 1923; name given to a variety of neptunite with Fe: Mn = 1 :2 from the Kola peninsula. Analysis gave: SiO_2 52.68, TiO_2 18.21, FeO 5.16, MnO 9.95, CaO 0.43, Mg O0.12,

Na_2O 9.16, K_2O 4.94; sum 100.65. Found associated with aegirite, natrolite and analcite also with eucolite and ramsayite.

DISCUSSION: Manganiferous neptunite would be a more appropriate name.

J. F. SCHAIRER

Loparite

A. E. FERSMAN: *C. R. Acad. Sc. Russie,* p.59(1922); *Trans. Northern Sc. Econ. Exped.,* No. 16, pp.17, 68(1923).

NAME: Source undetermined.

CHEMICAL PROPERTIES: Related to perovskite and contains TiO_2 49.6, rare earths 36.6, CaO 4.6, Na_2O 8.6, K_2O 0.04.

PHYSICAL PROPERTIES: Black, cubic crystals with complex twinning, metallic lustre and brown streak.

DISCUSSION: Needs further study. J. F. S.

Hoegtveitite

NAME: Specimens of alvite from a feldspar quarry on the farm Høgtveit, Evje parish, in Saetersdalen, Norway, were labeled hoegtveitite (høgtveitite or högtoveitite) by Dr. L. Eger of Vienna and distributed. J. Schetelig (*Videnskapsselsk. Skr. Mat. Nat. Klasse,* No. 1, p. 144, 1922) finds that it is alvite.

J. F. S.

Cergadinolite

NAME: J. Schetelig (*Videnskapsselsk. Skr. Mat. Nat. Klasse* No. 1, pp. 100, 120, 1922) describes a gadolinite from Fyrrisdal, Norway containing 23.4% of cerium earths. Schetelig (*ibidem* p. 121) calls it a "Ce-rich specimen" of gadinolite. L. J. Spencer (*Mineralog. Mag.* 20, 449, 1925) refers to this material as cergadinolite. J. F. S.

Mesodialyte

A. E. FERSMAN: *C. R. Acad. Sc. Russie,* p. 59,(1922); *Trans. Northern Sc. Econ. Exped.,* No. 16, pp. 16, 69,(1923).

NAME: For an intermediate member of the eudialyte—eucolite series.

PROPERTIES: Pseudo-isotropic.

DISCUSSION: An unnecessary burden to nomenclature.

J. S. F.

Vanadiolaumontite

NAME: A. E. Fersman (*Trav. Musée. Géol. Min. Pierre le Grand, Acad. Sc. Petrograd,* [2] 2, p.311, (for. 1916) 1922.) proposes the name vanadiolaumontite foı a yellowish-red mineral from Fergana allied to laumontite but containing 2.5% V_2O_5.

DISCUSSION. Data entirely insufficient to call it a new species.

J. F. S.

Chromepidote

F. ZAMBONINI (*Boll. Com. Geol. Italia,* 47, 80, 1920.) uses the name "Chromepidoto" as synonymous with tawmawite, a chromium-bearing epidote (A. W. G. Bleeck, *Rec. Geol. Surv. India,* 36, 254, 1908).

J. F. S.

Calcioancylite

A. E. Fersman: *C. R. Acad. Sc. Russie*, p. 60, **1922**; *Trans. Northern Sc. Econ. Exped.*, No. **16**, pp. 16, 41, 68, 72, (1923); G. P. Chernik: *Bull. Acad. Sc. Russie*, [6] **17**, 83, (1923).

Name: From composition.

Chemical Properties: Analysis, Ce_2O_3 47.27, Y_2O_3 0.74, CaO 4.36, SrO 12.11, BaO 1.59, CO_2 28.38, H_2O 5.55; sum 100.00. Soluble in HCl with evolution of CO_2.

Crystallographic Properties: Small, very badly developed, translucent crystals.

Physical Properties: Color brown-yellow, lustre vitreous to greasy, somewhat brittle, $H=4$. Sp. Gr. 3.82. No cleavage observed.

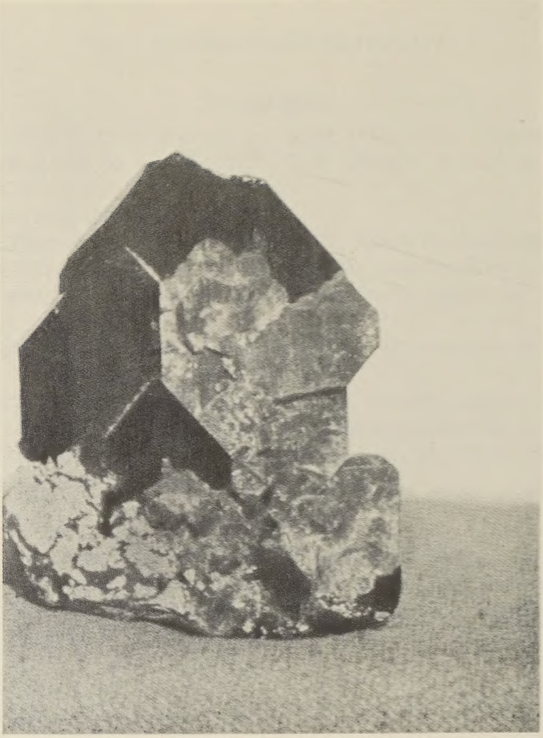
Occurrence: Associated with zircon, natrolite, ilmenite, aegirite, and yttrocerite, in the nephelite rocks in the district of Hibina (or Umptek) in the central part of the Kola peninsula (A. E. Fersman: *Am. Mineral.*, **11**, 289-97, 1926).

Discussion: A calcium bearing variety of ancylite. J. F. S.

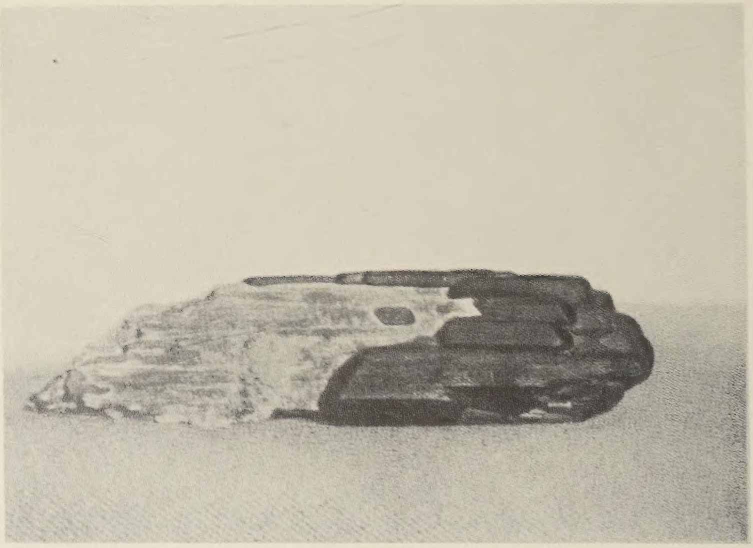
Manganomossite

E. S. Simpson: *Rept. Dept. Mines, W. Australia*, for 1922, p. 120 (1923). A pebble from Yinnietharra, Western Australia, gave on analysis: Ta_2O_5 44.53, Nb_2O_5 34.64, TiO_2 3.92, FeO 4.64, MnO 12.02, H_2O+ 0.26; sum 100.01. Sp. Gr. 6.21. This is doubtfully referred to as manganomossite rather than mangano-columbite.

J. F. S.



A



B

A. Three azurite crystals from Tsumeb, in parallel position, altering to malachite.

B. Pseudomorph of malachite after azurite from Bisbee, partially covered by second generation of azurite.